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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,153	12/08/2003	Paul Steven Mullin	010121-9954-00	2172

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EXAMINER	
RO, BENTSU	

ART UNIT	PAPER NUMBER
2837	

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Please find below and/or attached an Office communication concerning this application or proceeding.

H·A

Office Action Summary	Application N .	Applicant(s)	
	10/730,153	MULLIN ET AL.	
	Examiner	Art Unit	
	Bentsu Ro	2837	

-- The MAILING DATE of this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-53* is/are allowed.

6)☒ Claim(s) *1-5,7-11,13-18,24,25,28 and 42-46* is/are rejected.

7)☒ Claim(s) *6, 12, 19-23, 26, 27, 29-41, 47-53* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 December 2003* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/9/04*. (Total 11 pages).
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

FIRST OFFICE ACTION

1. This application contains claims 1-53, not 1-51 as described in the Election/Restrictions of the office action.

In response to the restriction, applicant has amended claims 29-53 to depend from either claim 1 or claim 15. Thus, claims 1-53 are pending.

2. Specification corrections are required as follows:

- Page 14 (paragraph [0060]), lines 9 and 11, each change "T3" to --T4--. (Total two occurrences).

- Page 15, paragraph [0064], lines 2-5, the statement

"If an override condition exists, the override condition signal L is utilized to change the second and fourth control signal C2 and C4 so the second control signal C2 is different than the first control signal C1 and the fourth control signal C4 is different than the third control signal C3."

is inaccurate. For example, if the input signal C1 is low, then output signal C2 can never be high because of AND gate. Thus, the C2 signal can never be different than C1 signal. It is only when input signal C1 is high, then in the presence of override condition signal L (low), the output signal C2 can be low or different than C1. A truth table is created by the examiner in the next page. In the truth table below, row numbers 1-4 show a first state of override signal L (low), wherein the C1 signal is not different from the C2 signal. In row numbers 9-12, the C3 signal is not different from the C4 signal.

In view of the above-mentioned reason, the statement "...so that the second control signal C2 is different than the first control signal C1 and the fourth control signal C4 is different than the third control signal C3..." is inaccurate.

Row	OUTPUT from			INPUT		OUTPUT	
No.	Sensor 216	Inverter 228	Override L	C1	C3	C2	C4
1	0	1	0	0	1	0	0
2	0	1	0	0	1	0	0
3	0	1	0	0	1	0	0
4	0	1	0	0	1	0	0
5	0	1	1	0	1	0	1
6	0	1	1	0	1	0	1
7	0	1	1	0	1	0	1
8	0	1	1	0	1	0	1
9	1	0	0	1	0	0	0
10	1	0	0	1	0	0	0
11	1	0	0	1	0	0	0
12	1	0	0	1	0	0	0
13	1	0	1	1	0	1	0
14	1	0	1	1	0	1	0
15	1	0	1	1	0	1	0
16	1	0	1	1	0	1	0

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 and 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ban US Patent No. 4,755,728.

Ban teaches the same subject matter as claimed, see the following comparison chart.

The claims:	**Ban's teaching:**
1. An electric machine comprising:	Fig. 3 shows an electric machine;
a stator assembly having a stator and a coil supported by the stator core;	the salient poles 5a-5d constitute a stator or stator core; the coil members 6a-6d constitute a coil; it is noted that the coil members 6a-6d is connected in series or in parallel, therefore, it is a single coil; see column 7, lines 3-5; Fig. 9 shows a single coil 6;
a rotor assembly having a shaft and a rotor supported by the shaft for rotation with the shaft relative to the stator coil,	Figs. 1 and 3 both shows a rotor 2 and a shaft 1; the rotor 2 rotates with respect to the stator (or armature members 6a-6d);
the rotor having a first magnetic pole and a second magnetic pole, the rotor being in magnetic interaction with the stator core; and	Fig. 3 shows a rotor 2 having magnetic poles N and S;
a single sensor configured to detect magnetic polarity of the rotor as the rotor rotates relative to the sensor	Fig. 9 shows a single Hall element 8; Fig. 4(b) shows the location of the Hall sensor relative to the rotor magnetic poles for detecting the magnetic polarity of the rotor relative to the Hall element 8; column 8, line 58 states "only one Hall element 8";

and to generate a signal representing the detected magnetic polarities of the rotor;	the "a signal" reads onto output of comparator 11a in Fig. 9; thus, the comparator is a part of the sensor even though two elements 8 and 11a are shown; **See more explanation at the end of this chart;**
the signal being in a first state when the first magnetic pole is detected and a second state when the second magnetic pole is detected,	the output of comparator 11a can be either high or low depending on the polarity of the rotor magnets;
the signal being inverted to form an inverted signal,	Fig. 9 shows an inverter 12c to invert the signal outputted from the comparator 11a; the output signal from the inverter 12c is an inverted signal;
the signal being utilized to control current through the coil in a first direction when the signal is in the first state	the signal after passing through an AND gate 12a to control the transistor 14a and 14b when the signal is in a HIGH state to control the current flow in a direction from 14a - coil 6 - 14b (or left-to-right in the current flow through the coil 6);
and the inverted signal being utilized to control current through the coil in a second direction when the signal is in the second state,	when the signal is LOW, the inverted signal becomes HIGH, this HIGH inverted signal, after passing through the AND gate 12b, controls the transistors 14c and 14d so that the current flow through the coil 6 is reversed, namely from 14c -coil 6- 14d (or right-to-left);
the current through the coil resulting in an alternating magnetic field in the stator core.	column 7, lines 31-32 states "...whereby the armature coil 6 is energized reciprocatingly.", this reciprocating energization results in an alternating magnetic field in the stator core.
2. an electric machine according to	The sensor 8 is a Hall sensor, see

claim 1, wherein the sensor is a Hall effect sensor.	column 5, line 27.
3. An electric machine according to claim 1, wherein the rotor extends axially beyond the stator core in at least one direction, and wherein the sensor is positioned adjacent an axial surface of the stator core and a radial surface of the rotor.	Fig. 1 shows the structure of the motor wherein the rotor 2 extends axially beyond the stator 6 in the upper direction; this is a common construction of a small fan motor; Fig. 4(a) may show the same structure.
4. An electric machine according to claim 1, wherein the rotor is a permanent magnet rotor.	Fig. 3 shows a permanent magnet rotor 2.
14. An electric machine according to claim 1, wherein utilizing the signal to control current through the coil in a first direction includes utilizing the signal to control voltage applied to the coil to produce current through the coil in the first direction, and wherein utilizing the inverted signal to control current through the coil in a second direction includes utilizing the inverted signal to control voltage applied to the coil to produce current through the coil in the second direction.	the switching ON of transistors14a and 14b by the output signal from AND gate 12a is utilizing the signal to control voltage applied to the coil to produce current through the coil in the first direction; the switching ON of transistors14c and 14d by the output signal from AND gate 12b is utilizing the inverted signal to control voltage applied to the coil to produce current through the coil in the second direction.

Further explanation:

Ban Fig. 9 shows a Hall element 8 and a comparator 11a. The function of the comparator has two folds, (1) make the Hall element output more sensitive to the magnetic field because the differential effect of the two inputs; (2) provide more output current to the AND gates.

In Ban Fig. 9, the comparator 11a can be omitted and a single output from the Hall element can be connected directly to the AND gates without changing the operation of the circuit. If the comparator 11a is omitted, then the Hall output signal is compared with a ground potential. This type of comparison is very similar to the operation of comparator 11a.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5, 7-11, 13, 15-18, 24, 25, 28, 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ban '728 Patent in view of Sato US Patent No. 4,600,864. (The Sato '864 reference was cited by applicant in his PTO-1449, page 2, filed 4/9/2004.)

Regarding claim 5, Ban concentrates his teaching on the control circuit, not on the motor structure, therefore, Ban does not detail the structure of the rotor, however Ban's rotor may be same as that of claim 5. If Ban's rotor is different from claim 5, then Sato Fig. 1 shows the same rotor and shaft as claimed, namely, a solid rotor having a bore for receiving the shaft.

The word "solid" implies a single piece. Therefore, a laminated rotor is also a solid rotor as long as the rotor is in a form of a single piece.

It is noted that the rotor must be made of ferrite material.

Regarding claim 7, Sato teaches the same stator structure. The word "tapered air gap" reads onto the portion between the large air gap 6 and smaller air gap 9, see Sato's Fig. 1A. Alternatively, Sato's Fig. 1B shows a tapered type air gap in the stator.

Regarding claim 8, Sato Fig. 1B shows a C-frame stator core 1, an I-bar 12 and a bobbin 11.

Regarding claims 9 and 10, as the examiner understand, the magnetic core is made from non-grain-oriented electric steel or grain-oriented electric steel. It is very important to note that, as long as the electric steel can conduct magnetic flux, the steel can be used to construct a motor core, whether the steel is grain-oriented or non-grain-oriented.

Regarding claims 11 and 13, as examiner understand, all circuit boards are either coated or encapsulated with plastic insulation for protection purpose. The coat or encapsulation of course include the Hall element because the Hall element is mounted on the circuit board.

The subject matter of Claims 15, 17, 18, 24, 25, 28, 42-46 has been discussed previously, further discussion is not necessary.

Regarding claim 16, neither Ban nor Sato teaches a buffer gate. The function of buffer gate is simply to boost the fanning power (or current) of the Hall element so that the Hall element can provide a heavier output to the load. Thus, if the driving load is heavy, then a buffer gate is required at the output of the Hall element. In view of the foregoing reason, using a buffer gate is a design consideration.

Then why using Ban's circuit in Sato's motor???

Applicant should note that Ban's circuit can be used with all single phase motors, including Sato's motor. Further, Sato's motor has advantage over Ban's motor because Sato's motor is cheaper and easy to construct. Sato's motor especially very useful inside a small appliance for cooling fan, such as a fan in a microwave oven, a kitchen exhaust fan, a bathroom exhaust fan, etc.

Because Sato's motor has such advantages, it would have been obvious to a skilled person in the art to use Ban's circuit to control Sato's motor to achieve the same subject matter as claimed.

7. Claims 6, 12, 19-23, 26, 27, 29-41, 47-53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number (571) 272-2072.

Bentsu Ro

1/28/05

Bentsu Ro
Senior Examiner
Art Unit 2837